

selected from lubricating oils and animal and vegetable oils; an exhaust gas introducing flow path provided at a bottom portion of the exhaust gas purifying tank, and introducing exhaust gas which is to be purified into the exhaust gas purifying liquid accommodated in the exhaust gas purifying tank; and an exhaust gas guide-out flow path which guides exhaust gas, which has flowed through the exhaust gas purifying liquid, out to an exterior of the exhaust gas purifying tank, wherein a floating sphere filter which is equipped with floating spheres, which are a group of spheres, and a floating sphere accommodating chamber, which accommodates the floating spheres at an interior and which has a bottom plate and a ceiling plate formed such that the exhaust gas can flow therethrough and whose side walls are formed by floating walls which are thrust so as to push the floating spheres to return toward a central portion, is provided at the exhaust gas guide-out flow path.

A second aspect of the present invention relates to an exhaust gas purifier comprising: a first exhaust gas purifying tank accommodating, at an interior, an exhaust gas purifying liquid selected from lubricating oils and animal and vegetable oils; a second exhaust gas purifying tank accommodating, at an interior, a nitrogen oxide removing liquid which has affinity with respect to nitrogen oxides and sulfur oxides; a first exhaust gas introducing flow path provided at a bottom portion of the first exhaust gas purifying tank, and introducing exhaust gas which is to be purified into the exhaust gas purifying liquid accommodated in the first exhaust gas purifying tank; a second exhaust gas introducing flow path provided at a bottom portion of the second exhaust gas purifying tank, and introducing exhaust gas, which has been guided-out from the first exhaust gas purifying tank, into the nitrogen oxide removing liquid accommodated in the second exhaust gas purifying tank; and an exhaust gas guide-out flow path which guides exhaust gas, which has been introduced into the exhaust gas purifying liquid, out to an exterior of the second exhaust gas purifying tank, wherein a floating sphere filter which is equipped with floating spheres, which are a group of spheres, and a floating sphere accommodating chamber, which accommodates the floating spheres at an interior and which has a bottom plate and a ceiling plate formed such that the exhaust gas can flow therethrough and whose side walls are formed by floating walls which are thrust so as to push the floating spheres to return toward a central portion, is provided at both of the second exhaust gas introducing flow path and the exhaust gas guide-out flow path.

A third aspect of the present invention relates to, in the exhaust gas purifier relating to the above-described second aspect, an exhaust gas purifier in which the nitrogen oxide removing liquid is water.

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A fourth aspect of the present invention relates to an exhaust gas purifier having an exhaust gas purifying tank accommodating, at an interior, an exhaust gas purifying liquid selected from lubricating oils and animal and vegetable oils; an exhaust gas introducing means provided within the exhaust gas purifying tank, and introducing exhaust gas into the exhaust gas purifying liquid accommodated in the exhaust gas purifying tank; and an exhaust gas guide-out flow path which guides out exhaust gas which has flowed through the exhaust gas purifying liquid, wherein the exhaust gas introducing means is equipped with: an exhaust gas jetting portion which jets exhaust gas in a given direction; and an exhaust gas flow guiding duct which extends along a direction of jetting exhaust gas at the exhaust gas jetting portion, and a purifying liquid return opening, through which the exhaust gas purifying liquid flows in, is provided at one end of the exhaust gas flow guiding duct, and an opening portion, through which exhaust gas purifying liquid which has flowed through an interior flows out, is provided at another end of the exhaust gas flow guiding duct, and the exhaust gas jetting portion is accommodated in a vicinity of the purifying liquid return opening, and a floating sphere filter which is equipped with floating spheres, which are a group of spheres, and a floating sphere accommodating chamber, which accommodates the floating spheres at an interior and which has a bottom plate and a ceiling plate formed such that the exhaust gas can flow therethrough and whose side walls are formed by floating walls which are thrust so as to push the floating spheres to return toward a central portion, is provided at the exhaust gas guide-out flow path.

A fifth aspect of the present invention relates to an exhaust gas purifier having an exhaust gas purifying tank accommodating, at an interior, an exhaust gas purifying liquid selected from lubricating oils and animal and vegetable oils; an exhaust gas introducing means provided within the exhaust gas purifying tank, and introducing exhaust gas into the exhaust gas purifying liquid accommodated in the exhaust gas purifying tank; and an exhaust gas guide-out flow path which guides out exhaust gas which has flowed through the exhaust gas purifying liquid, wherein the exhaust gas introducing means is equipped with: an exhaust gas jetting portion which jets exhaust gas in a given direction; and an exhaust gas flow guiding duct which extends along a direction of jetting exhaust gas at the exhaust gas jetting portion, and a purifying liquid return opening, through which the exhaust gas purifying liquid flows in, is provided at one end of the exhaust gas flow guiding duct, and an opening portion, through which exhaust gas purifying liquid which has flowed through an interior flows out, is provided at another end of the exhaust gas flow guiding duct, and the exhaust gas jetting

portion is accommodated in a vicinity of the purifying liquid return opening, and an exhaust gas purifying liquid agitating portion, which is equipped with an agitating sphere accommodating chamber, which is formed such that exhaust gas can flow therethrough, and agitating spheres, which are accommodated floatably at an interior of the agitating sphere accommodating chamber, and which agitates exhaust gas purifying liquid flowing out from an interior of the exhaust gas flow guiding duct, is provided in the vicinity of the opening portion provided at the other end of the exhaust gas flow guiding duct.

A sixth aspect of the present invention relates to, in the exhaust gas purifier relating to the above-described fifth aspect, an exhaust gas purifier in which a floating sphere filter which is equipped with floating spheres, which are a group of spheres, and a floating sphere accommodating chamber, which accommodates the floating spheres at an interior and which has a bottom plate and a ceiling plate formed such that the exhaust gas can flow therethrough and whose side walls are formed by floating walls which are thrust so as to push the floating spheres to return toward a central portion, is provided at the exhaust gas guide-out flow path.

A seventh aspect of the present invention relates to, in the exhaust gas purifier relating to any one of the above-described fourth through sixth aspects, an exhaust gas purifier in which the exhaust gas jetting portion is formed so as to jet the exhaust gas upwardly and obliquely upwardly.

A²_{c-d} An eighth aspect of the present invention relates to, in the exhaust gas purifier relating to any one of the above-described fifth through seventh aspects, an exhaust gas purifier in which the agitating sphere accommodating chamber is a agitating sphere rotating container which is formed so as to be able to rotate around an axis which extends in a horizontal direction.

A ninth aspect of the present invention relates to, in the exhaust gas purifier relating to any one of the first through eighth aspects, an exhaust gas purifier in which the exhaust gas purifying liquid is a lubricating oil.

A tenth aspect of the present invention relates to, in the exhaust gas purifier relating to the ninth aspect, an exhaust gas purifier in which the lubricating oil has a viscosity of 5 to 2,000 cSt.

Page 18, lines 1 through 24, delete all lines of the text, and insert therefore:

bronze spheres, aluminum bronze spheres, phosphor bronze spheres, beryllium bronze spheres, cupronickel spheres, and the like.

Other examples of the floating spheres 14 are soft-material-covered spheres in which the surface of the above metal sphere is covered by a soft material such as rubber, a thermoplastic elastomer, or a soft resin, e.g., soft vinyl chloride resin or the like, and ceramic spheres and the like.

Here, the exhaust gas purifier shown in Fig. 1 is usually used in a state of being loaded in a large-sized automobile such as a truck or the like. Thus, during use thereof, the exhaust gas purifier always receives vibrations from the road surface.

Accordingly, the exhaust gas purifying tank 2 also receives horizontal direction acceleration. Further, the floating sphere filter 16 and the floating spheres 14 accommodated in the floating sphere filter 16 also receive horizontal direction acceleration.

A³ The floating spheres 14 which receive the horizontal direction acceleration push the floating wall 12D, which is at the side to which the acceleration is applied, toward the side wall 12E at the facing side which, together with that floating wall 12D, sandwiches the springs 12F. In this way, these springs 12F contract in the direction of the acceleration. Thus, due to the thrusting force from these springs 12F, that floating wall 12D moves toward the central portion of the floating sphere accommodating chamber 12, and the floating spheres 14 as well are

Page 72, before line 1, delete the paragraph - Claims - and insert the following paragraph -

I Claim: